DISCOVERY AND SUSTAINABLE SUPPLY OF MARINE NATURAL PRODUCTS AS DRUGS, INDUSTRIAL COMPOUNDS AND AGRO-CHEMICALS: CHEMICAL ECOLOGY, GENETICS, AQUACULTURE AND CELL CULTURE. *Memoirs of the Queensland Museum 44: 76. 1999*:- Using chemical ecological clues, it is now possible to target habitats and eco-taxonomic groups of marine organisms to increase the likelihood of discovery of species which elicit natural compounds with chemotherapeutic or industrial application. Using the same clues, combined with Geographic Information System interrogation of the benthic geomorphology and oceanography associated with target species, it is possible to identify locations allowing recollection of species of interest. The information gained from both primary collections and focused recollections, provides the basis for hypothesis-driven experiments examining sustainable supply options for extracted target metabolites where synthesis is not practicable.

We describe recent results from an integrated multi-disciplinary programme designed to develop sustainable production options for a variety of marine natural products that have interesting biologieal activities. Three species of sponge from the genera *Lissodendoryx*, *Mycale* and *Latrunculia*, produce novel metabolites with anti-tumour activity. The natural abundance of each would not support a production industry based on wild harvest should their metabolites be required for drug production. Each has been successfully cultured in-sea demonstrating very good to excellent growth parameters. Each can be cultured with maintenance of target metabolite biosynthesis. In addressing the question of how to optimally produce target compounds, it has been necessary to examine a number of key biological issues pertaining to each species. These include genetic identity of populations supplying seed material, correlates with variable target metabolite biosynthesis in natural populations, origin of target metabolite biosynthesis (symbiont or sponge), and the efficacy of artificial production techniques (sea or land aquaculture or cell culture).

We conclude that the guess-work can now be taken out of artificial culture of sponges with a view to produce desirable natural products. It is possible to select for a high yielding culture stock and provide techniques to enhance biosynthesis or target metabolites. ❐ *Porifera, marine natural products, aquaculture, genetics, cell culture.*

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CHARACTERIZATION OF CALCIUM-BINDING MATRIX PROTEINS FROM DISTINCT CORALLINE DEMOSPONGES. *Memoirs of the Queensland Museum 44: 76. 1999*:- Calcified sponges played an important role as reef building organisms during different geological time periods. Living relatives of this group investigated here, *Spirastrella (Acanthochaetetes) wellsi*, *Astrosclera willeyana* and *Vaceletia n. sp.*, can be found in cryptic niches of indopacific coral reefs. The first known relatives of some of these sponges are known since the upper permian.The mode of biomineralization of the examined species seems to be extremely conservative, since they are phylogenetically very old and exhibit merely minor alterations in their calcareous skeletons. Each of the three species exhibits a unique type of basal skeleton with its own specific modifications of carbonate crystals. Each species was shown to have a specific array of calcium-binding macromolecules enclosed within its intraskeletal matrix. The proteins are separated by SDS polyacrylamide gel electrophoresis. A single protein was detected in *S. wellsi*, two proteins in *A. willeyana*, and four proteins in *Vaceletia n. sp.*. All proteins were characterized by their molecular weight and isoelectric point. The soluble matrix constituents of each species were tested for their potential to decrease precipitation of calcium and strontium carbonate, respectively, in a saturated solution. The findings strongly suggest that these soluble proteins function as the template for skeletal formation and are responsible for determining the particular type of calcium carbonate polymorphs. ❐ *Porifera, biomineralization, organic matrix, calcium-binding proteins, calcite, aragonite.*

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